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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/751,813	12/29/2000	Brinkley Sprunt	42390.P8258	8469

8791 7590 04/02/2004

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EXAMINER	
YIGDALL, MICHAEL J	

ART UNIT	PAPER NUMBER
2122	10

DATE MAILED: 04/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/751,813	SPRUNT ET AL.	
	Examin r	Art Unit	
	Michael J. Yigdall	2122	

-- The MAILING DATE of this communication appears on th cover she t with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 February 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7-9,18,20,21 and 25-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7-9,18,20,21 and 25-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 9.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office action is in reply to applicant's response and amendment dated 5 February 2004. Claims 1-4, 7-9, 18, 20, 21 and 25-29 are pending.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-3, 9, 18, 20 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 5,835,705 to Larsen et al. (hereinafter Larsen).

With respect to amended claim 1, Larsen discloses an apparatus comprising:

(a) a processor to execute a plurality of threads simultaneously, each thread including a series of instructions (see processor 10 in FIG. 1, and column 3, lines 39-55, which shows the multithreaded processor for executing concurrent threads comprising groups of instructions);

(b) an event detector to detect a predetermined list of events and to transmit an event detection signal to a multiplexer (see performance monitor 50 and multiplexer 82 in FIG. 2, and column 4, lines 50-57, which shows the performance monitor detecting a predetermined list of events; see also column 5, lines 7-17, which shows transmitting event signals to the multiplexer);

(c) an event selection control register (ESCR) to instruct the multiplexer to select an event from the predetermined list of events by qualifying the event based on a set of conditions (see control registers 80 in FIG. 2, and column 5, lines 7-17, which shows the control registers selecting events based on the mode of operation and other conditions);.

(d) an event counter to count the event qualified by the multiplexer (see performance monitor counters 84 in FIG. 2, and column 4, lines 50-57, which shows the counters recording or counting the events qualified by the multiplexer); and

(e) an access location to allow access to the event counter to determine a current count of the event (see integer registers 38 in FIG. 1, and column 4, lines 57-61, which shows outputting the counter values to the integer registers, i.e. the access locations).

With respect to amended claim 2, Larsen further discloses the limitation wherein the access location allows access to determine the count without disturbing the operation of event counter (see column 7, lines 40-52, which shows accessing the registers to read a count without disturbing the operation of the counters).

With respect to amended claim 3, Larsen further discloses the limitation wherein the ESCR comprises a first field of bits to choose the event to be counted (see column 5, lines 7-17, which shows the control registers having bit fields to select the events to be counted).

With respect to amended claim 9, Larsen further discloses the limitation wherein the predetermined list of events includes hardware performance and breakpoint events (see column 5, lines 46-56, which shows the predetermined list of events, including hardware performance events such as instructions completed and processor cycles, along with breakpoint events such as thread switch counts).

With respect to amended claim 18, Larsen discloses a method comprising:

(a) executing a plurality of threads simultaneously, each thread including a series of instructions (see processor 10 in FIG. 1, and column 3, lines 39-55, which shows the multithreaded processor for executing concurrent threads comprising groups of instructions; see also column 4, lines 21-28, which shows executing the instructions);

(b) detecting a predetermined list of events and transmitting an event detection signal to a multiplexer (see performance monitor 50 and multiplexer 82 in FIG. 2, and column 4, lines 50-57, which shows the performance monitor detecting a predetermined list of events; see also column 5, lines 7-17, which shows transmitting event signals to the multiplexer);

(c) instructing the multiplexer to select and event from the predetermined list of events by qualifying the event based on a set of conditions (see control registers 80 in FIG. 2, and column 5, lines 7-17, which shows the control registers selecting events based on the mode of operation and other conditions);

(d) counting the event qualified by the multiplexer using an event counter (see performance monitor counters 84 in FIG. 2, and column 4, lines 50-57, which shows the counters recording or counting the events qualified by the multiplexer); and

(e) accessing the event counter to determine a current count of the event (see integer registers 38 in FIG. 1, and column 4, lines 57-61, which shows outputting the counter values to the integer registers; see also column 7, lines 40-52, which shows accessing the registers to determine a current count of the event).

With respect to amended claim 20, Larsen further discloses the limitation wherein the qualifying of the event includes requiring that the event has a preselected thread ID (see column

6, line 54 to column 7, line 3, which shows selecting and routing events based on the identity of the thread to which they correspond).

With respect to new claim 28, Larsen further discloses the limitation wherein the preselected thread ID represents a thread of the plurality of threads where the event occurred (see column 6, line 54 to column 7, line 3, which shows selecting and routing events based on the identity of the thread to which they correspond).

Claim Rejections - 35 USC § 103

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Larsen, as applied to claim 1 above, in view of U.S. Pat. No. 6,205,468 to Diepstraten et al. (hereinafter Diepstraten).

With respect to amended claim 4, although Larsen discloses control registers with bit fields for selecting events to be recorded, setting the mode of operation, and enabling or disabling event counting (see column 5, lines 7-17), Larsen does not expressly disclose the limitation wherein the ESCR further comprises a second field of bits to choose the event to be masked and not counted.

However, Diepstraten discloses the limitation above in terms of an event masker associated with an event recorder (see column 4, lines 42-50, which shows event masking for selecting one or more events to be ignored; see also event mask register 90 in FIG. 3, which shows the control bits for event masking).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Larsen with the event masking feature taught by Diepstraten,

for the purpose of reducing the number of events that will be processed (see Diepstraten, column 4, lines 42-50).

5. Claims 7, 8, 21, 25-27 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larsen, as applied to claims 1 and 20 above, respectively, in view of U.S. Pat. No. 5,657,253 to Dreyer et al. (hereinafter Dreyer).

With respect to amended claim 7, although Larsen discloses software-writable event counters (see column 4, lines 50-57), Larsen does not expressly disclose the limitation wherein the event counter is stopped and cleared before a new event is selected.

However, Dreyer discloses the limitation above in terms of resetting the event counter using an instruction (see column 3, lines 19-22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Larsen with the counter reset feature taught by Dreyer, for the purpose of stopping and clearing the counter values with software.

With respect to amended claim 8, although Larsen discloses software-writable event counters (see column 4, lines 50-57), Larsen does not expressly disclose the limitation wherein the event counter is preset to a certain state.

However, Dreyer discloses the limitation above in terms of presetting the event counter to a certain value (see column 3, lines 19-22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Larsen with the counter preset feature taught by Dreyer, for the purpose of enabling functions such as countdowns (see Dreyer, column 4, lines 21-30).

With respect to amended claim 21, although Larsen discloses control registers with bit fields for selecting events to be recorded, setting the mode of operation, and enabling or disabling event counting (see column 5, lines 7-17), Larsen does not expressly disclose the limitation wherein the qualifying of the event further includes requiring that the event has a preselected thread current privilege level (CPL).

However, Dreyer discloses the limitation above in terms of control register bits for enabling event counting based on the current privilege level (see column 4, lines 39-46).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Larsen with the CPL feature taught by Dreyer, for the purpose of differentiating events based on supervisor and application levels of operation (see Dreyer, column 4, lines 60-65).

With respect to new claim 25, Larsen further discloses the limitation wherein the qualifying of the event is performed using a thread ID (see column 6, line 54 to column 7, line 3, which shows selecting and routing events based on the identity of the thread to which they correspond), but does not expressly disclose the limitation wherein the qualifying of the event is performed using a thread current privilege level (CPL).

However, Dreyer discloses the limitation above in terms of control register bits for enabling event counting based on the current privilege level (see column 4, lines 39-46).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Larsen with the CPL feature taught by Dreyer, for the purpose

of differentiating events based on supervisor and application levels of operation (see Dreyer, column 4, lines 60-65).

With respect to new claim 26, Larsen further discloses the limitation wherein the thread ID indicates a source of the event, the source include a thread of the plurality of threads where the event occurred (see column 6, line 54 to column 7, line 3, which shows selecting and routing events based on the identity of the thread to which they correspond, i.e. the source thread where the events occurred).

With respect to new claim 27, the combination of Larsen and Dreyer further discloses the limitation wherein the thread CPL indicates a privilege level at which the thread at which the event occurred was operating when the event occurred (see Dreyer, column 4, lines 39-46, which shows that the CPL indicates a current privilege level at which the thread is operating when an event is to be counted).

With respect to new claim 29, the combination of Larsen and Dreyer further discloses the limitation wherein thread CPL indicates a privilege level at which the thread was operating at when the event occurred (see Dreyer, column 4, lines 39-46, which shows that the CPL indicates a current privilege level at which the thread is operating when an event is to be counted).

Response to Arguments

6. Applicant's arguments have been fully considered but they are not persuasive.

Applicant contends that Larsen does not teach or reasonably suggest the detection, selection and qualifying of events as recited by independent claims 1 and 18 (see page 7, top).

However, as set forth above in paragraph 3, Larsen discloses an event detector to detect a predetermined list of events (for example, see performance monitor 50 in FIG. 2 and column 4, lines 50-57), and an event selection control register to instruct a multiplexer to select an event and qualify the event based on a set of conditions (for example, see control registers 80 and multiplexer 82 in FIG. 2, and column 5, lines 7-17).

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Yigdall whose telephone number is (703) 305-0352. The examiner can normally be reached on Monday through Friday from 8:00am to 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (703) 305-4552. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MY

Michael J. Yigdall
Examiner
Art Unit 2122

mjy
March 30, 2004

ANTONY NGUYEN-BA
PRIMARY EXAMINER